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Decision-Science Applications, Inc.

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1. BACKGROUND

The mission of the National Law Enforcement and Corrections Technology Center-Northeast Region (NLECTC-NE), in conjunction with the Air Force Research Laboratory/Information Directorate (AFRL/IF), is to facilitate the identification, development, and adoption of new products and technologies specifically designed for law enforcement, corrections, and other criminal justice applications. The current technology thrust areas for the Northeast Region are Concealed Weapons Detection, Automated Firearm Identification, Timeline Analysis, Computer Forensics, Audio/Video Processing, Information Management, Automatic Speaker Recognition, and Automatic Language Translation. This report outlines the major accomplishments of the NLECTC-NE under the Decision-Science Applications, Inc. (DSA) Task Ordering Agreement (TOA).

1.1 NLECTC-NE CENTER

The NLECTC-NE Center is located in Central New York at the Air Force Research Laboratory/Information Directorate (formerly Rome Laboratory) in Rome, NY. DSA and New York State Technology Enterprise Corporation (NYSTEC) support the management of the Center under contract. The Team consists of both DSA and NYSTEC personnel.

2. OUTREACH ACTIVITIES

The Team has conducted a number of outreach activities, primarily through presentations and attendance at regional and national law enforcement and corrections conferences and seminars across the Northeast. A list of the conferences and meetings is shown in Table 2.1.

Table 2.1: Outreach Activities/Conferences

DATE	CONFERENCE	LOCATION
April 1997	New Hampshire Police Chiefs Training Seminar	Concord, NH
May 1997	Dual Use Technologies & Applications Conf.	Syracuse, NY
May 1997	Project Northstar Borderwide Meeting	Portland, ME
June 1997	Maryland Corrections Administrators Assoc.	Ocean City, MD
June 1997	Northeast Wardens' Conference	Newport, RI
July 1997	Ohio Corrections Technology Network Meeting	Columbus, OH
August 1997	Office of Special Narcotics Seminar	New York City, NY
August 1997	Vermont Law Enforcement Coordinating Committee	Colchester, VT
September 1997	Northeastern Criminal Justice Exhibit	Boston, MA
September 1997	New England State Police Administrators Conf.	Sturbridge, MA
September 1997	National Association of Fugitive Investigators	Albany, NY
September 1997	Government Technology Conference	Albany, NY
September 1997, November 1997	New York City School Safety	New York, NY
October 1997	134th Eastern Armed Robbery Conference	Tinton Falls, NJ
November 1997	Technology Day on Global Positioning System	Rome, NY
December 1997, January 1998, February 1998	New York State Department of Correctional Services, Product Evaluation Committee	Albany, NY
January 1998	Leadership Challenge Committee	Aberdeen, MD
February 1998	Yorktown Police Department	Yorktown, NY
March 1998	NLECTC-NE/MAGLOCLEN Tech Day	Rome, NY
April 1998	Congressional Technology Day	Washington, DC
April 1998	MAGLOCLEN Annual Conference	Pittsburgh, PA

3. TECHNOLOGY INITIATIVES

Support was provided through interface with the Law Enforcement and Corrections community, various AFRL/IF engineers in facilitating the introduction of technology into the hands of law enforcement and corrections agencies across the Northeast. These technologies include Concealed Weapons Detection, Speech Processing and Timeline Analysis. The three technology initiatives, outlined below, have been researched by AFRL/IF engineers and presented to the law enforcement and corrections community by the Team.

3.1 CONCEALED WEAPONS DETECTION

3.1.1 Background

The Air Force Research Laboratory (AFRL) manages and directs several programs funded by the Defense Advanced Research Project Agency (DARPA) and the National Institute of Justice (NIJ) in the Concealed Weapon Detection (CWD) area. The status of each of these tasks is described briefly below.

3.1.2 Secure 1000 Imager

Two Secure1000 x-ray-imaging systems were procured and delivered to a state prison located in Raleigh, North Carolina and to the US Marshall's office in Los Angeles, California. The Border Research Technology Center has expressed an interest in receiving "The West Coast" Secure1000 x-ray imager to support customs service operations at the California - Mexico border. The customs service is in the process of evaluating the necessity of implementing this equipment. In addition, the New Mexico State Prison in Santa Fe has expressed an interest in receiving "The West Coast" Secure1000 x-ray imager to survey inmates for concealed weapons. The New Mexico State Prison will supply an evaluation of the Secure1000.

3.1.3 Syracuse University Project

Detailed technical briefings were provided to Syracuse University in support of NIJ's commercialization program. These briefings included discussions of each of the following technologies: millimeter wave imaging radiometer, acoustic imaging, magnetic imaging, passive magnetic detection, and x-ray imaging. Syracuse University provided a final report, which includes technical issues, relevant legal areas of intellectual properties, marketing introduction strategies, constitutional issues, and government regulations. The DSA Team supported this effort by providing funding, attending the technical briefings and adding input on the draft copy.

3.1.4 Media Exposure

An article entitled "Devices May Let Police Spot People on the Street Hiding Guns" appeared in the New York Times on 7 April 1997. Representatives of NIJ were interviewed for the article and discussed the CWD trials in North Carolina and California. The article also gave an extensive background on CWD technology, where it came from and where it is going. A similar article on CWD, entitled "Rome Lab Aids in Gun Detection," appeared in the 9 April 1997 edition of the Utica, NY newspaper, Observer-Dispatch. AFRL/IF representatives discussed the CWD tests in North Carolina and California and gave a brief overview of the NLECTC-NE Center. NLECTC-NE received permission from the New York Times to put the article on the Northeast web site.

3.1.5 Through-The-Wall-Surveillance

The Through-the-Wall-Surveillance (TWS) technical program was initiated. Technical discussions with both government and private industry representatives were held. The technologies discussed included: millimeter wave radiometers, millimeter wave radar, applications of ground penetrating radar, impulse radar technology, FM radar technology, and radar-acoustic techniques. It is anticipated that several other additional technologies will be considered. These technologies will include acoustic, signal and image processing and tagging. The Team also participated in a training exercise with the Albuquerque, NM SWAT team. During this training exercise, two TWS systems were integrated into the SWAT units. The training exercise simulated a hostage situation within a large building and the TWS systems proved to be sensitive to very slight personal movements within the building.

3.1.6 Other CWD Initiatives

Detailed technical briefings to Sandia National Lab in support of Sandia's counter measure program were provided. These briefings included discussions of each of the following technologies: millimeter wave imaging radiometer, acoustic imaging, magnetic imaging, passive magnetic detection, and x-ray imaging.

Technical discussions were held with the *Federal Aviation Administration* (FAA) Technical Center, Atlantic City, NJ. These discussions included the integration of backscatter CWD technology with explosive detection technology. It was focused on the common technical interest of the FAA and the NIJ.

The installation of the first passive magnetic detector at the Bannock County Court House in Pocatello, Idaho was finalized. Three additional passive metal detectors will be installed and networked to provide centralized security in the courthouse. Testing of the complete networked CWD system will be conducted during 1998.

3.2 SPEECH PROCESSING

3.2.1 Background

AFRL/IF engineers are researching various Speech Processing technologies including audio/video restoration, spoken language translation, speaker identification, in-vehicle voice verification, and voice stress analysis. Progress on each of these initiatives is outlined below.

3.2.2 NIJ Funding Study for Applicability of Audio Technologies to Prison Applications

AFRL/IF's Cost Effectiveness Analysis Study for Voice Identification for Prisons proposal has been accepted for funding by the National Institute of Justice. The objective of the effort was to perform a cost/benefit analysis on the use of audio technologies for Federal prison applications. The National Institute of Justice provided funding for the investigation. AFRL/IF personnel presented the status of the study of the "Applicability of Speech and Audio Technologies to the Federal Prison Environment" to representatives of the Bureau of Prisons, the Department of Justice, and the FBI in Washington DC in September of 1997. The status was also presented to David Boyd (NIJ) and Dr. Henry Lee (Conn. State Police Forensic Lab) during their visit to the AFRL/IF. Study participants were asked to delay work on the effort until the competitive procurement for a standardized telephone system for Federal Prisons was completed. This study was on hold for the first two months of 1998 and during this time the bidder for the

new inmate phone system was selected. The study was resumed with a meeting with the BOP in Washington in March of 1998 and a request was made for points of contact for the prison visits and for magnetic audiotapes made on the current phone system. The information required for the study on telephone monitoring was identified and incorporated in a questionnaire that was used to obtain the necessary information at each prison.

3.2.3 Voice Stress Analysis

The program to evaluate Voice Stress Analysis Techniques was approved and funded by the National Institute of Justice. The program investigates the reliability of determining the spoken truth from deception by observing changes in voice characteristics. This effort would help law enforcement interrogators to obtain information and reduce investigation time and associated costs. Local law enforcement personnel are playing an active role in this research effort.

The objective of this effort was to determine the value and usefulness of existing Voice Stress Analysis (VSA) technology for law enforcement and military requirements. It was determined that numerous commercial VSA systems are being marketed as capable of detecting stress in a persons voice, possibly indicating that the speaker is being deceptive. User accounts of their experiences in applying VSA technology continue to be collected from law enforcement representatives throughout the United States. One of the two commercial VSA systems purchased was delivered for evaluation and two research team members completed the training offered by the system's vendor. Audio taped interrogations with known conclusions were collected in order to form an audio database for evaluation. A test and evaluation plan was developed that contained blackbox testing, real data testing from the collected database, and correlated VSA/polygraph testing. There is an ongoing effort to obtain information on patent rights for the various systems and the function of the International Society of Stress Analyzers.

Two VSA systems were acquired and a third purchase is pending. The database collection required to test and evaluate the VSA units has been compiled and documented. The plan for the blackbox testing was developed, and the testing was completed. The runs from the actual database were used to verify test procedures.

3.3 TIMELINE ANALYSIS

3.3.1 Background

The Timeline Analysis System (TAS) assists analysts with the comprehension of large amounts of information through the use of reasoning tools and data visualization. TAS has both military and law enforcement applications. The most relevant law enforcement initiatives are discussed below.

3.3.2 Law Enforcement Interface

The Team coordinated with the NY State Police (Troop B) to provide the TAS training to load data and use the analytical tools. Troop B was in the process of obtaining an Air Force reservist to help with TAS and wanted to use TAS for counterdrug efforts. AFRL/IF planned to meet with the NY State Troopers at Ray Brook (Troop D). Action was on hold for several months while the new version of TAS (TAS V4.0) was in development and testing. A V4.0 was made available for use at Ray Brook if they wanted to participate. With this version, new event types, etc. could be built specifically for their use. In addition, a TAS demonstration was given to

the New York State Police, Bureau of Criminal Investigation. Based on this demonstration, additional meetings were planned for discussion of the potential use of TAS in NYSP case analyses.

LEAF obtained three actual criminal cases from the Rome Police Department for experimental entry into TAS. TAS was expected to capture and present the specific data provided by Rome Police Department. Once this was accomplished, a demonstration was provided to the investigators to determine the value added. The NY State Police proposed to enter data from a Troop F (Middletown NY) case into TAS as a future effort.

3.3.3 Installation

The TAS has been installed in NYSTEC's computer facility and has loaded a sample set of provider claims, representing two years for two counties, into an accessible database. TAS was set up in the LEAF and training has been initiated for personnel.

4. DOJ COUNTERTERRORISM STUDY

A Department of Justice (DOJ) Counterterrorism needs assessment was initiated by Congress and planned, organized and hosted by NLECTC-NE. Various police experts from across the NE region met in Rome, NY to participate in the needs assessment. Tri-Data Corporation conducted the interviews and focus groups resulted in positive feedback. A report was published in July 98 that detailed the findings of the study. A copy of this needs assessment was placed in the NLECTC-NE document library.

5. COMMUNICATIONS STUDIES

Several projects were initiated dealing with state and local law enforcement and corrections communications and interoperability issues.

A visit with the Security Director of the Minnesota Department of Corrections Facility at Stillwater (MCF-Stillwater) was conducted. A site assessment, including several significant signal reception limitations identified by the Warden, was conducted. Recommendations for equipment and procedures for improving their communications capability were presented in the form of an analysis. The NLECTC-NE document library contains a copy of this analysis.

On-site technical support for an NLECTC-NE evaluation of the McLean County 911 Communications Center in Bloomington, IL was provided. NLECTC-NE staff, consisting of the Team members, accompanied personnel from NLECTC-SE to evaluate several issues. An assessment of their communications system was made to determine causes for long access times and poor voice transmission quality. The development of an engineering solution to the above issues was completed.

NLECTC-NE and AFRL/IF representatives attended a meeting addressing the communication interoperability problem in Vermont and New Hampshire. In attendance were the Vermont Public Safety Commissioner, the Vermont US Attorney, a US Marshall from New Hampshire, Vermont Senator Leahy's staff person and Vermont technical support.

6. NLECTC-NE ADVISORY COUNCIL

The NLECTC-NE Advisory Council was composed of law enforcement and corrections practitioners from each of the 16 states in the Northeast region. The Advisory Council's mission was to provide prioritization of requirements, address state and local issues, and to support interfaces with the law enforcement and corrections community within each state.

The Council meets biannually within the various states in the Northeast region. Four Advisory Council meetings have been held with the Team fully supporting each Advisory Council meeting, including the planning and coordinating of sites, agendas, travel arrangements and guest speakers.

7. NLECTC VIDEO PROJECT

In September 97, Team members planned, organized and participated in an NLECTC video project. Members of the Office of Law Enforcement Technology Commercialization (OLETC) and a film crew from NASA's Classroom of the Future visited the NLECTC-NE and recorded footage of the Center and various AFRL technologies for the NLECTC video project. In addition to the technologies, law enforcement practitioners (a veteran police officer, a District Attorney, and a Forensic Lab Director) were interviewed and filmed. A rough copy of the final video was received and has been in review in conjunction with the local practitioners who participated. The final version of the video project, which will feature all of the NLECTC Centers, was scheduled to be completed by mid-1998.

8. <u>TECHNICAL ASSISTANCE</u>

8.1 UTICA ARSON STRIKE FORCE

A needs assessment of the Utica Arson Strike Force (UASF) was performed to determine the Strike Force's need for technology. Pursuant to this needs assessment, technical assistance was provided to the UASF with a digital camera for acquiring evidence at the scene of an arson fire. It was determined that a Local Area Network (LAN) would be necessary to take advantage of the ASCMe lead tracking and investigation software that was to be provided by the Bureau of Alcohol Tobacco & Firearms. A demonstration site including a LAN, a color scanner, laser printer and color printer has been established. Technical support to install and administer the LAN was also provided. Since its installation, the LAN has been used to administer an UASF web page, send and receive information on the Internet, and provide high quality investigation documents and wanted posters. In addition, it has provided the necessary information technology to enable information sharing between the members of the UASF and the Utica Police Department Special Investigation Unit, which has led to the successful apprehension of major criminal figures. A report that was prepared for David Boyd of the NIJ has been made available for review in the NLECTC-NE document library.

8.2 UTICA 21 PROJECT

The Utica 21 project was the result of a technology needs assessment for the Utica Police Department (UPD) which was conducted by the NLECTC Southeast Regional Center in cooperation with the NLECTC Northeast Regional Center. This project included a baseline assessment of the current information management practices, recommendations of improvements and a phased implementation plan to introduce technology into the department as time and resources allow.

The assessment team worked jointly with the members of the UPD to determine the current information management practices. Evaluation methods included on-site visits, interviews, and reviews of policies, procedures and standards. The application of information technology will enable the UPD to attain its operational goals while improving quality of service to the community. The phased implementation approach will allow the UPD to introduce technology in a way that will allow personnel to adapt to the new environment over time, while exposing them to the benefits of automation.

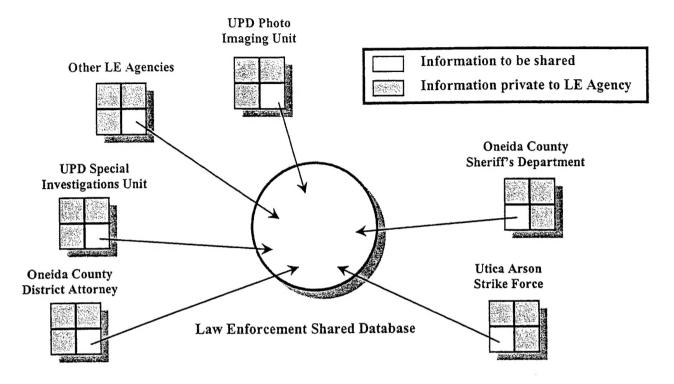
This modernization effort would enable the UPD to make the transition into the 21st century and would ultimately serve as a model for similar police departments across the Northeast region. The NLECTC-NE document library has a copy of the study available for review.

8.3 YORKTOWN POLICE DEPT. COMPUTER NEEDS ASSESSMENT

Personnel conducted an on-site computer system needs assessment of the Yorktown Police Department located in Yorktown Heights, NY and reported on the information management concerns of the department followed by NLECTC-NE's recommendations. A copy of the needs assessment has been made available for review in the NLECTC-NE library.

8.4 WAN-CNY

We conceived the data-sharing concept of Wide Area Network-Central New York (WAN-CNY). Participating agencies included the Oneida and Onondaga County District Attorney's Offices, the Utica, Rome and New Hartford Police Departments and the Oneida County Sheriff's Department. The network was intended for use as a nationwide model for the law enforcement community. Figure 8.1 shows a graphical representation of the WAN-CNY concept with its shared database.



- Individual LE Agencies download and maintain their own information in shared database
- All agencies have 'read' access to all information in shared database
- No agency has access to another agency's LAN

Figure 8-1: WAN-CNY

8.5 FORENSIC INVESTIGATION INFORMATION MANAGEMENT ANALYSIS

The FIIMS analysis was done in partnership with The National Institute of Justice/Office of Science & Technology Team (including NLECTC-NE, AFRL/IF, DSA, and NYSTEC) and the New York State Police Forensic Investigation Center, the New York State Division of Criminal Justice Services, and the New York State District Attorney's Association. It was conducted as an analysis of the information management requirements for the acquisition and development of real-time multimedia teleconferencing forensic capabilities. Requirements included data collection & access, multi-tasking access to multiple disciplines on-line at point of attack, telecommunications, crime scene, violent crime case review, and simultaneous collection, processing, and analysis. The FIIMS report was submitted to the New York State Police Forensic Investigation Center and utilized as a planning aid for upgrades to their Forensic Investigation Center (FIC).

8.6 OTHER TECHNICAL ASSISTANCE EFFORTS

Technical support has been provided to the New York State (NYS) Department of Correctional Services (DoCS) Product Evaluation Committee (PEC). The PEC evaluates new products to be procured by the NYS DoCS system or facilities. Information coordination has been provided for the PEC by tracking product evaluations in other states to facilitate information exchange and provide technical advice on products under evaluation.

An interface has been established with the Middle Atlantic Great Lakes Organized Crime Law Enforcement Network (MAGLOCLEN), which is part of the Regional Information Sharing System (RISS). To date, several meetings and activities focusing on sending both the NLECTC-NE and MAGLOCLEN messages to the law enforcement community have been coordinated. The Utica Police Department's enrollment in MAGLOCLEN was successfully facilitated and plans have been made to assist other agencies similarly. A distance learning project with local law enforcement using contacts made through MAGLOCLEN has also been planned. In addition, an NLECTC-NE visit in mid-June 98 for members of the Delaware State Police was scheduled. This visit was made possible through the MAGLOCLEN interface.

Participation in the Office of Law Enforcement Technology Commercialization (OLETC) Advisory Council and Project North Star (a coalition of U.S. and Canadian law enforcement agencies dealing with border issues) was also a key component of support.

General technical support to the NLECTC-NE has also been provided including compilation of reports for NIJ, conference and meeting coordination, maintenance of the Northeast website, facilitation of the 1033 surplus equipment program, and grant assistance. We continue to analyze and respond to the requests for information received by the Center. There have been 397 requests for information received by the NLECTC-NE since the Center began operations. These requests have included audio/video demonstration requests, grant information, 1033 surplus equipment, publications, and general requests for information on Center functions and activities.

9. FUTURE OUTLOOK

A vast majority of NLECTC-NE's efforts are ongoing. Technical and administrative support will be required to be provided.

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The advancement and application of information systems science and technology for aerospace command and control and its transition to air, space, and ground systems to meet customer needs in the areas of Global Awareness, Dynamic Planning and Execution, and Global Information Exchange is the focus of this AFRL organization. The directorate's areas of investigation include a broad spectrum of information and fusion, communication, collaborative environment and modeling and simulation, defensive information warfare, and intelligent information systems technologies.